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PORSF 11.3.12-6 05/31/2005

DRAFT

BES WATER POLLUTION CONTROL LABORATORY

Oregon DEQ ECSI #: 2452

6543 N Burlington
DEQ Site Mgr: no PM
Latitude: 45.5847°
Longitude: -122.7575°
Township/Range/Section: 1N/1W/12

River Mile: 6.1 East bank

LWG Member ☒ Yes ☐ No

Upland Analytical Data Status: ☐ Electronic Data Available ☒ Hardcopies only

1. SUMMARY OF POTENTIAL CONTAMINANT TRANSPORT PATHWAYS TO THE RIVER

The current understanding of potential transport pathways of contaminants from the uplands portions of the City of Portland Bureau of Environmental Services (BES) Water Pollution Control Laboratory (WPCL) site to the river is summarized in this section and Table 1, and supported in following sections.

1.1. *Overland Transport*

There is no overland transport of stormwater directly to the river. Stormwater from the site is collected and conveyed to onsite stormwater treatment systems (see Section 1.3).

1.2. *Riverbank Erosion*

The riverbank is stabilized with riprap and vegetation.

1.3. *Direct Discharge (Overwater Activities and Stormwater/Wastewater Systems)*

Currently, there are no overwater activities at the site. Stormwater collecting at the site is treated either through an onsite stormwater treatment pond or engineered bioswales. The treatment pond also receives stormwater from the St Johns neighborhood (area of approximately 45 acres). The stormwater treatment pond discharges to the Willamette River via City Outfall 50 located on the northwest side of the site. Stormwater runoff from the adjacent Crawford Street Site is transported onto the site as sheet flow, passes over a landscaped area and into the City's conveyance system, where it is discharged through City Outfall 50.

1.4. *Groundwater*

No groundwater plumes have been identified at the site based on groundwater data collected across the site. Remedial excavation activities have further reduced the possibility of impacts to groundwater from contaminated soil sources. Groundwater is unlikely to be a current or ongoing pathway for contamination to reach Willamette River surface water or sediment (see Section 10.2).

1.5. *Relationship of Upland Sources to River Sediments*

See Final CSM Update.

1.6. Sediment Transport

The City of Portland BES site is located along the east bank of the river at approximately RM 6 and within the narrow river reach (RM 5-7) that is characterized as a transport/non-depositional zone in the Programmatic Work Plan (Integral et al. 2004). The near shore bottom slopes fairly steeply to channel depth. The Sediment Trend Analysis® indicates that dynamic equilibrium transport paths dominate in this portion of the river. The time-series bathymetric change data over the 25-month period from January 2002 through February 2004 (Integral and DEA 2004) indicate that a swath between the – 0 and –20 foot NAVD88 contours is dominated by sediment scour (up to 2 feet) at the upstream half of the site and transitions to sediment accretion (to 1 foot) at the downstream end of the site. Below the –20 foot NAVD88 contour and out across the channel, the riverbed is a mosaic of small-scale erosion and no change areas. Overall, minimal sediment accretion is evident in this segment of the river.

2. CSM SITE SUMMARY REVISIONS

Date of Last Revision: May 31, 2005

3. PROJECT STATUS

Activity		Date(s)/Comments
PA/XPA	☒	PA in progress; initial PA research completed (CDM 2001). PA submittal anticipated Spring 2005
RI	☐	
FS	☐	
Interim Action/Source Control	☐	
ROD	☐	
RD/RA	☐	
NFA	☐	

DEQ Portland Harbor Site Ranking (Tier 1, 2, or 3): Tier 3

4. SITE OWNER HISTORY

Primary Sources: CDM 2001; DEQ 1999b, 2004

Owner/Occupant	Type of Operation	Years
City of Portland WPCL Lampros Steel (tenant)	Analytical Laboratory (constructed in 1996). Steel Storage (property rented to Lampros Steel 1988 – 1990s)	1979 to present
Brand S Corporation St. Johns Lumber Company Portland Lumber Mills Portland Manufacturing Company	Lumber mill operations	1930s – 1979
Coast Veneer Box Company	Fruit box manufacturer	mid 1930s-1970s

5. PROPERTY DESCRIPTION

The site is located at 6543 N Burlington Avenue along the eastern bank of Willamette River just south of the St. Johns Bridge. The site is comprised of three tax lots totaling 8.9 acres. The WPCL and associated buildings are located at parcel number R425806620. Two additional parcels located north of the main lab site (parcel numbers R425806900 and R425806020) contain a stormwater treatment pond, public trails and undeveloped shoreline. Figure 1 shows the location of current site features including the treatment pond.

The site is located in an area of mixed industrial, commercial, and residential use (DEQ 1999). The site topography is fairly level across the northeastern half of the site, ranging from 30-38 feet above mean sea level (MSL). On the southwestern portion of the site, the land surface slopes down toward the river from an elevation of 30 feet above MSL to 6 feet above MSL. The laboratory consists of one main building that is 24,024 square feet and a workshop that is 12,537 square feet in area. A parking lot, located adjacent to the buildings, covers an area of 27,832 square feet.

Several stormwater treatment systems were installed as part of the site development, including a stormwater treatment pond constructed north of the WPCL and engineered bioswales. Site runoff from impervious areas (the site parking lot areas and rooftops) is treated either in the stormwater treatment pond or in engineered bioswales. Runoff from the neighboring Crawford Street site is transported as sheet flow onto the WPCL property (City of Portland, 2004a). The runoff flows over a landscaped area before draining to the City stormwater conveyance system, where it discharges through the City Outfall 50.

City Outfall 50 receives stormwater from approximately 45 acres of residential and commercial properties (CH2M HILL, May 2004) and discharges to the river at the WPCL riverbank. Stormwater from the Outfall 50 basin is treated in the stormwater treatment pond before it is discharged to the river. Outfall 50 was built as a combined sewer overflow (CSO) outfall, however the potential sanitary overflow component of Outfall 50 was separated in 1995 as part of the St. Johns Basin Separation Project. Outfall 50 has been a stormwater-only outfall since 1995.

Four properties are located adjacent to the site. The locations and owners of adjacent properties include the following:

North: Cathedral Park, which is owned by the City of Portland. There is no address for this property, but it is located just north of the St. Johns Bridge at parcel number R425807000.

East: Marine and Commercial Leasing at 8638 N Crawford Street, parcel number R425800010. Pacific Equipment Rental at 8614 N Crawford Street, parcel number R425806540.

South: Schnitzer Steel (building listed as Lampros Steel) at 8524 N Crawford Street, parcel number R739100250.

The Willamette River is located on the west side of the site. Information regarding the lease of submerged lands or overwater structures was not located in Oregon Department of State Land files.

6. CURRENT SITE USE

The site is currently operating as the City of Portland BES Water Pollution Control Laboratory (WPCL) and staff offices. Research and laboratory analysis of samples related to the City's storm and sanitary sewer systems are conducted at the WPCL. All stormwater runoff is managed on site via engineered bioswales and the treatment pond north of the main building. The site is listed with the DEQ as a conditionally exempt generator of hazardous waste (generator identification number ORQ000005249). As part of SARA Title III requirements, the laboratory lists argon, helium, and hydrogen gases as hazardous substances used and stored onsite. All chemicals used at the laboratory are stored, handled, and controlled in accordance with the WPCL Chemical Hygiene Plan and the BES Hazardous Communication Plan. Material Safety Data Sheets (MSDS) are maintained and housed at the WPCL for all chemicals used for laboratory operations. None of the chemicals at the WPCL are stored outside the facility or have exposure to stormwater.

7. SITE USE HISTORY

This site has a history of industrial wood products manufacturing usage up to the 1970's, which included fruit box manufacturing and lumber mill/wood finishing. There are no records indicating wood treating operations were performed at the site.

Aerial photographs show a high level of industrial activity on the site from the 1930s through the 1960s (see Figures 2-4). The 1963 photograph shows a lumber mill on the southern future laboratory parcel and a vacant lot with log piles on the northern future laboratory parcel. The 1974 photograph shows that the mill had been demolished; however, piles of wood and debris remained on the southern future laboratory parcel. The 1980 photograph shows that at that time both parcels were vacant except for a few log piles.

The Coast Veneer Box Company was located on the northwest portion of the site, adjacent to N. Pittsburg Avenue. This facility manufactured fruit boxes from the mid-1930s until the late 1970s. This building was demolished in 1973. Portland Lumber Mills was located on the southeastern portion of the site, which was demolished during the 1970s. The mill facility was comprised of several buildings, including a boiler in the southwestern part of the site near the Willamette River and a dock along the riverbank. The boiler reportedly burned sawdust until the middle 1960s, when it switched to natural gas. Dry kilns onsite were heated with steam generated from the boiler, and later with natural gas.

The Portland Lumber Mill was located on an elevated deck at the level of the UPRR tracks. The area surrounding the deck appears to have been filled over the years to the present grade. The source of fill material surrounding the deck is not known but based on site investigations; the fill material consisted of dredged material, construction debris, and ash.

At least four episodes of various fill placements have been identified at the subject site. Supplemental Figure 5 (CDM 2001) shows the location of each fill group at the site. A summary of each fill episode is provided below:

- Pre-1970's fill that brought the site to the grade of the pavement for the Portland Lumber Mill
- Early 1970's fill in the foundation of the Coast Veneer facility and along the bank of the river
- Placement of "black sand" fill in the Coast Veneer area and in isolated piles on the southern portion of the site
- From 1988 to 1989, construction and other debris were disposed in the southern and northwestern portions of the site.

In 1979, the City of Portland (Portland Development Commission) bought the site from the Brand S Corporation. The site was vacant until 1988, when Lampros Steel rented the property from the City for the storage of new steel until approximately 1993. Construction of the WPCL was completed in 1996.

8. CURRENT AND HISTORIC SOURCES AND COPCS

The understanding of historic and current potential upland and overwater sources at the site is summarized in Table 1. The following sections provide a brief overview of the potential sources and COPCs at the site.

8.1. *Uplands*

Potential historic sources investigated include lumber mill operations, fruit box construction operations, and fill and debris placed on the site. The PA (CDM, 2001) identified petroleum-based lubricants as the only potential contaminants of concern associated with the historical mill and box manufacturing operations. The potential presence of wood treating facilities associated with the mill operations at the site was evaluated in the PA (CDM, 2001) and no evidence of wood treatment facilities or activities was found in historical information.

Prior to construction of the WPCL, BES conducted environmental and geotechnical site investigations to evaluate historical activities, including fill placement. Impacted media identified during the investigations include the petroleum hydrocarbon impacted black sand fill and the PCB-impacted soil adjacent to the former subsurface electrical conduit. Remedial excavation activities have eliminated these potential secondary sources (RZA 1994a and 1994b). Data collected from the investigations also indicate that there are no current upland sources at the site (RZA 1994a and 1994b). Site investigation and remediation activities are further summarized in Sections 10 and 11 of this document.

8.2. Overwater Activities

☐ Yes ☒ No

Currently, there are no overwater activities at the site. Historic overwater activities at the site were associated with lumber mill operations when the dock was present. The PA (CDM, 2001) identified petroleum-based lubricants as potential contaminants of concern associated with mill operations. PCP detected in a single groundwater sample near the shore also has been identified as a contaminant potentially associated with buried treated timbers that formed the Portland Lumber Mill deck structure (RZA 1994b).

8.3. Spills

Database resources reviewed include: DEQ's Emergency Response Information System (ERIS) database for the period of 1995 to 2004, U.S. Coast Guard and the National Response Center's centralized federal database for oil and chemical spills recorded from 1982 to 2003, facility-specific technical reports, and DEQ correspondence. See Appendix E of the Portland Harbor Work Plan (Integral et al. 2004).

With the exception of a PCB release in 1993 associated with removal of a buried electrical conduit and site cleanup, there are no known or documented spills at the site. During the 1993 geotechnical investigation, drilling activities caused the rupture of a subsurface electrical conduit containing a petroleum-based liquid with PCBs (RZA 1994a). BES notified the DEQ and conducted a subsurface investigation and cleanup in accordance with Toxic Substance Control Act (TSCA) regulations (RZA 1994a).

9. PHYSICAL SITE SETTING

Information regarding the geology and hydrogeology of the site is based on the geotechnical and environmental investigations (CH2M Hill 1995; RZA 1994a, 1994b) and the Preliminary Assessment Report (CDM 2001). Investigation activities included data collected from trenches, test pits, and monitoring wells.

9.1. Geology

The site is underlain by fill materials, unconsolidated alluvium deposited by the historic Willamette River, and lava flows of the Columbia River Basalt Group (CRBG) (CH2M Hill, 1995). The fill material is between 10 and 20 feet thick and consists primarily of silt with wood chips, and rubble. Alluvium consisting of silt and sand are expected to be approximately 90 to 100 feet thick. The CRBG is estimated to be approximately 120 feet bgs in the vicinity of the site (Madin 1990).

9.2. Hydrogeology

Site-specific hydrogeologic information was collected from 5 monitoring wells in October 1993 (RZA 1994a). The monitoring well depths ranged from 40 to 42 feet bgs. Depth to groundwater measurements ranged from approximately 23 to 27 feet bgs. Information regarding the direction of groundwater flow was not available in the reviewed information. The monitoring wells were abandoned before construction activities began. There are no monitoring wells currently on site. Other wells identified near the site include: (1) an irrigation well installed in 1999 at Cathedral Park to the north of the site, with a static water level of 23 feet bgs, and (2) three monitoring wells installed in 2001 at Lampros Steel to the south of the site with a static water level of 28 feet bgs. City staff recently have noted the possible seepage of minor quantities of shallow groundwater into the stormwater treatment pond north of the main building (City of Portland, 2004b).

10. NATURE AND EXTENT *(Current Understanding)*

The current understanding of the nature and extent of contamination for the uplands portions of the site is summarized in this section. When no data exist for a specific medium, a notation is made.

10.1. Soil

10.1.1. Upland Soil Investigations

☒ Yes ☐ No

Several upland soil investigations have been performed at the site as part of geotechnical and environmental investigations (CDM 2001). The majority of soil investigations were completed in the mid-1990s in preparation for constructing the laboratory. Each investigation is summarized in this section.

1973 Subsurface Investigation

Shannon and Wilson conducted a subsurface investigation on the site (CDM 2001). The investigation focused on the fill material located in the Coast Veneer area of the site and the embankment along the Willamette River. The investigation identified soil from an area south of Richmond Street, or dredge material from the Willamette River adjacent to the site as potential sources of fill on the site.

1978 Geotechnical Investigation

RZA was retained by the Portland Development Commission to conduct a geotechnical investigation of the site (CDM 2001). The investigation included one investigative boring and one test pit located in the Coast Veneer area of the site.

1989 Exploration of Fill

EMCON performed an investigation of the fill material at the site. A figure showing the extent of the identified fill units was the only record available from the investigation [see Supplemental Figure 5 from CDM (2001)]. The figure indicates that test pits were completed at the site concentrating mainly on evaluating the black sand fill located in the northern portion of the site.

1993/1994 Fill Investigation

RZA was retained by BES to conduct an environmental site investigation of the fill material at the site (RZA 1994b). The primary focus of the investigation was on the black sand fill identified as spent sand blasting material, possibly used to clean petroleum storage tanks. The maximum thickness of the black sand was 6 feet in the location of the historic Coast Veneer facility. Soil samples were collected from 5 trenches to evaluate this area [see Supplemental Figure 6 from CDM (2001)]. Soil samples were also collected at several isolated areas with black sand fill located in the southern portion of the site near the old foundation of the Portland Lumber buildings. A total of 20 samples were collected at the site: 19 were analyzed for TPH; and a single sample (labeled T2-10 and collected from the black sand fill) was analyzed for VOCs and PCBs. Four of the 19 samples had concentrations of TPH above 100 mg/kg; the maximum TPH concentration was 667 mg/kg. No VOCs were detected in sample T2-10; PCB concentrations were less than the EPA residential cleanup level of 1 ppm and the Oregon generic remedy residential cleanup level of 1.2 ppm Characterization of the fill material was used to direct remedial excavations in the appropriate areas at the site (see Section 11.1).

1993/1994 Electrical Conduit Investigation

Drilling activities during a 1993 geotechnical investigation by RZA caused the rupture of a subsurface electrical conduit (RZA 1994a). The conduit contained a petroleum-based liquid with PCBs (PCB concentration of 1,000 mg/L). Soil sampling was performed to assess the extent of the PCB-impacted soil. Approximately 90 cubic yards of impacted soil was excavated in the release area. The electrical conduit (approximately 350 feet long) was also excavated and removed at this time [see Supplemental Figure 6 from CDM (2001)]. During excavation, a historical release related to a joint in the conduit was discovered. Approximately 100 cubic yards of impacted soil was excavated from this area. Confirmation sampling (total of 20 samples) was performed from the finished excavations. The maximum concentration of PCBs detected in the final confirmation samples was 0.39 mg/kg, which is less than State of Oregon generic remedy residential cleanup level of 1.2 ppm (RZA 1994a). The total volume of liquid released from both areas of the conduit was estimated to be less than 2 gallons.

Soil excavated from the conduit trench was segregated into two piles: Soil Pile #1 (150 cubic yards) contained known PCB contamination and Soil Pile #2 (40 cubic yards) contained soil that most likely did not contain PCBs. Composite samples of the soil piles identified PCB concentrations of 800 mg/kg in Soil Pile #1 and 0.13 mg/kg in Soil Pile #2. Soil Pile #2 was used as backfill at the site in areas which are now covered by either asphalt, buildings, or landscaping. Soil Pile #1 was placed in lined drop boxes and disposed at an offsite facility.

1993/1994 Subsurface Investigation

An additional subsurface investigation was performed in 1994 by RZA to evaluate other areas of the site with potential contamination sources (RZA 1994b). The investigation included the completion of 20 test pits and the installation of 5 monitoring wells [see Supplemental Figure 6 from CDM (2001)]. Eleven soil samples collected from the test pits were analyzed for TPH (EPA Method 418.1). Seven of the samples had concentrations of TPH below 20 mg/kg (RZA 1994b). Four samples had detections greater than 20 mg/kg. One of these four samples contained a TPH concentration of 534 mg/kg, slightly above the DEQ Matrix Level 2 standard of 500 mg/kg. RZA concluded that the source of petroleum hydrocarbons appears to be the fill itself and not an external source, and these areas appear to be isolated and limited in extent (CDM 2001). These areas are now covered by asphalt, buildings, or landscaping.

10.1.2. Riverbank Samples ☐ Yes ☒ No

No riverbank samples have been collected at this site. The bank has been stabilized with riprap and vegetation.

10.1.3. Summary

Several soil investigations have been performed at the site including assessments of the fill material, subsurface electrical conduit corridor, and the overall environmental conditions at the site. Two contaminant sources affecting soil at the site were identified: 1) petroleum hydrocarbon impacted fill material (black sand fill) and 2) releases of a petroleum-based liquid with PCBs from the subsurface electrical conduit. However, subsequent remedial excavations removed most of the impacted soil related to both sources. Testing subsequent to the excavation indicated that only 1 of the 11 test pit samples had a TPH concentration slightly exceeding the DEQ Matrix Level 2 standard of 500 mg/kg.

Concentrations of PCBs in confirmation samples collected from the electrical conduit remedial excavation were below the applicable State of Oregon generic remedy residential cleanup level for PCBs. Soil containing remnant concentrations of PCBs and TPH is capped under the new structures and surfaces and is not a likely current or ongoing contaminant from upland sources to the river.

10.2. Groundwater

10.2.1. Groundwater Investigations ☒ Yes ☐ No

Two groundwater investigations (1989 and 1993) have been performed at the site (CDM 2001). Information regarding the 1989 investigation is limited since a copy of the report is not available for review.

In 1993, a groundwater investigation was performed at the site as part of site preparation for the WPCL construction (RZA 1994b). The investigation included the installation of 5 monitoring wells and one round of groundwater monitoring [see Supplemental Figure 6 from CDM (2001)]. The wells were abandoned after the monitoring event was completed.

10.2.2. NAPL (Historic & Current) ☐ Yes ☒ No

No NAPL has been identified at the site.

10.2.3. Dissolved Contaminant Plumes ☐ Yes ☒ No

The results of the groundwater sampling event in 1989 are limited because the original EMCON document summarizing the sampling activities is not available. The results of the 1993 investigation were summarized in the RZA (1994a) report. It is known that the groundwater samples collected in 1989 were apparently obtained from four borings rather than properly installed and developed monitoring wells. Reportedly, a "slightly elevated level" of 2,4-dimethylphenol was detected in one of these samples. No further information regarding the actual concentration or the possible source is available for the 1989 sampling event. Based upon the fact that the water sample was collected from a boring, rather than a properly installed and developed monitoring well, CDM (2001) concluded that the sample data from the 1989 investigation are likely not reliable.

Groundwater samples collected during the 1993 groundwater monitoring event were analyzed for PCBs and chlorinated phenols. No odors or petroleum product sheen were noted during the monitoring event (RZA 1994b). The City believes that the soil and groundwater testing indicate that groundwater was not impacted by contaminants in the fill material. The Preliminary Assessment (to be submitted in 2005) for the site will elaborate upon these issues for final concurrence by DEQ. No PCBs were detected in any of the groundwater samples (RZA 1994b). Pentachlorophenol (PCP) was detected in the sample collected from MW-5 at a concentration of 18 ug/L. Monitoring well MW-5 penetrated the fill material placed in the early 1970s. RZA indicated that the detection of PCP may be the result of either (1) matrix interference due to sediment in the sample, suggesting that the detected concentration is not representative of groundwater impacts; or (2) possibly related to PCP from treated timber pilings since monitoring well MW-5 was located in the area of the historic Portland Lumber Company deck above the river (RZA 1994b).

Plume Characterization Status ☐ Complete ☒ Incomplete

No groundwater plumes have been identified at the site. The City is awaiting DEQ review and concurrence with this conclusion.

Plume Extent

No groundwater plumes have been identified at the site.

Min/Max Detections (Current situation)

N/A

Current Plume Data

N/A

Preferential Pathways

No review of preferential groundwater transport pathways has been conducted at the site because no groundwater plume was identified at the site.

Downgradient Plume Monitoring Points (min/max detections)

N/A

Visual Seep Sample Data ☐ Yes ☒ No

Available records indicate that no seeps have been identified at the site (GSI 2003).

Nearshore Porewater Data

Porewater data have not been collected at the site.

Groundwater Plume Temporal Trend

N/A

10.2.4. Summary

Groundwater investigations at the site did not identify the presence of groundwater plumes. With the exception of monitoring well MW-5, no contaminants were detected in the groundwater samples. The laboratory report indicates that PCP was detected in the MW-5 groundwater sample at a concentration of 18 ug/L. However, RZA concluded that the result was attributable to either (1) matrix interference by sediment in the sample or (2) possibly related to the presence of treated timber pilings in the area of the groundwater sample.

10.3. Surface Water

The site is currently operating as the City of Portland BES WPCL and staff offices. In addition to the laboratory, the site was specifically designed to test, implement, and show new stormwater treatment options in operation. As part of the site development, several stormwater treatment systems were installed. All stormwater runoff is managed on site via engineered bioswales and a stormwater treatment pond north of the main building. Site runoff from impervious areas (parking lot and rooftops) is treated either in the treatment pond or in engineered bioswales. The site continues to be used to test innovative stormwater treatment options.

10.3.1. Surface Water Investigation ☐ Yes ☒ No

No surface water investigations have been conducted except for inlet and outlet monitoring at the wetland treatment pond to evaluate treatment effectiveness.

10.3.2. General or Individual Stormwater Permit (Current or Past) ☐ Yes ☒ No

Based on the SIC codes designation for the site, a DEQ storm water permits are not required.

Do other non-stormwater wastes discharge to the system? ☒ Yes ☐ No

Some non-stormwater discharges through Outfall 50. Groundwater seepage has been observed into the stormwater treatment pond. Flows from an outdoor Benson bubbler drinking fountain in St. Johns also discharge to this conveyance system.

10.3.3. Stormwater Data ☐ Yes ☒ No

10.3.4. Catch Basin Solids Data ☐ Yes ☒ No

10.3.5. Wastewater Permit ☐ Yes ☒ No

10.3.6. Wastewater Data ☐ Yes ☒ No

10.3.7. Summary

Site stormwater is treated either through a treatment pond located just north of the main building or in engineered bioswales. City of Portland Stormwater Outfall 50 is located in the northwest corner of the site.

10.4. Sediment

10.4.1. River Sediment Data ☒ Yes ☐ No

A shallow sediment sample collected adjacent to the BES site and upstream of the City outfall by an EPA contractor in 1997 as part of the Portland Harbor Sediment Investigation (Weston 1998) showed only an elevated level of di-n-butyl phthalate (SD058) exceeding the Portland Harbor baseline value. A shallow sediment (SD060) sample collected 400 feet upstream adjacent to the Crawford Street site exceeded Portland Harbor baseline concentrations including arsenic, lead, mercury, di-n-butylphthalate, and LPAHS and HPAHs, indicating that the di-n-butylphthalate observed adjacent to the subject site in sample SD058 may have come from an upstream source (DEQ 1999b).

Subsequent samples collected adjacent to the City outfall by CH2M Hill in October 2002 showed elevated concentrations of chromium, copper, zinc, and lead detected in in-river sediments. Based on riverbank data from the Crawford Street (ECSI #2363) site, it appears that these constituents may be coming from this upriver source (CH2M Hill, March 2004). All surface sediment chemical data are summarized in Table 2, including sediment samples upstream of the site outfall. Sediment sampling locations in the vicinity of the BES WPCL site are shown on Figure 1.

10.4.2. Summary

See Final CSM Update.

11. CLEANUP HISTORY AND SOURCE CONTROL MEASURES

11.1. Soil Cleanup/Source Control

Based on the characterization and delineation of the fill material, a remedial excavation was coordinated to remove 2,113 cubic yards of black sand fill and debris from the site. The material was segregated and disposed of at an appropriate offsite location (CDM 2001).

Two PCB releases to subsurface soil were discovered and remediated in 1993 (DEQ 2004). A release of PCB-containing liquid (DEQ #93-314) from the conduit resulted in the excavation of approximately 150 cubic yards of soil. About 350 linear feet of conduit was removed, and another historical release of PCBs to subsurface soil was discovered and removed at the same time. Contaminated soil and conduit were disposed of at an offsite facility (DEQ 1999).

11.2. Groundwater Cleanup/Source Control

Available records indicate that no groundwater cleanup or source control activities have been conducted at the site.

11.3. Other

11.4. Potential for Recontamination from Upland Sources

See Final CSM Update.

12. BIBLIOGRAPHY / INFORMATION SOURCES

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Figures:

Figure 1. Site Features
Figures 2 – 4: Historical Aerial Photographs

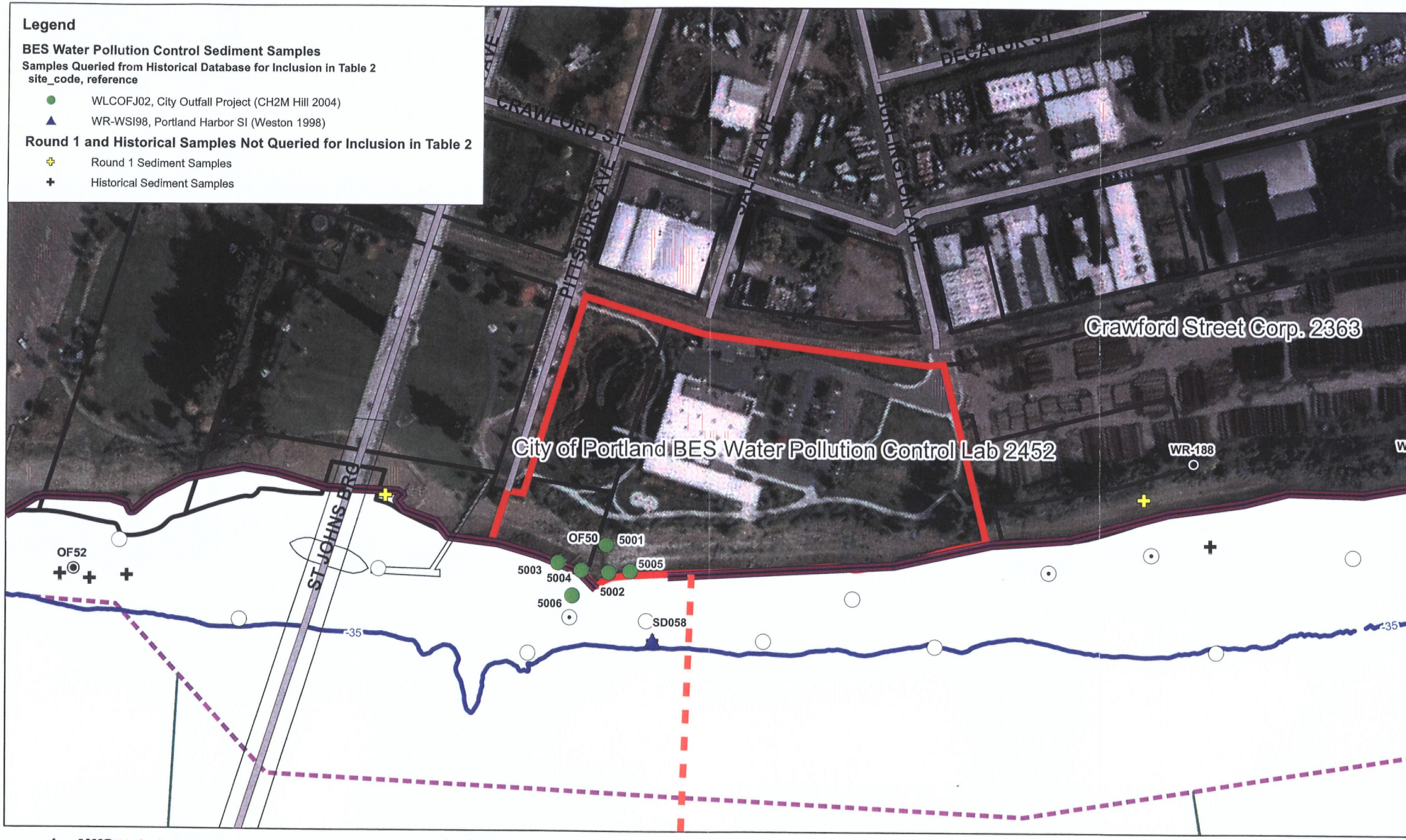
Tables:

Table 1. Potential Sources and Transport Pathways Assessment
Table 2. Queried Sediment Chemistry Data

Supplemental Figures:

Figure 5: 1989 Exploration of Fill by Sweet Edwards/EMCON
Figure 6: 1994 Environmental Site Investigations by RZA-AGRA

FIGURES



integral consulting inc.

LWG Lower Willamette Group

Map Document: (C:\GIS\Projects\Portland_Harbor\LWG-Map-Projects\Conseptual_Site_Model\Sample_Locations_3rd_Group.mxd)
Plot Date: 05/26/2005

Areal Photo Date: October 2001.
Base Map features from Portland Metro's RLIS.

Outfall information contained on this map is accurate according to available records; however, the City of Portland makes no warranty, expressed or implied, as to the completeness or accuracy of the information published (updated March 2005).

Legend

- Outfalls
- Seep Photo Location (Not location of actual Seep)
- Selected ECSI Site Property Boundary
- Navigation Channel
- Docks & In-water Structures
- River Miles
- -35ft. Contour (NAVD 88)

Human Use Areas

- Dockside Worker
- Recreational Beach Use
- Transient

LWG Round 2 Proposed Sediment Samples

- Surface Sample Only
- Core & Surface Sample

0 50 100 200 Feet

DRAFT

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Figure 1-Site Features
Portland Harbor RI/FS
Conceptual Site Model
BES Water Pollution Control
ECSI 2452

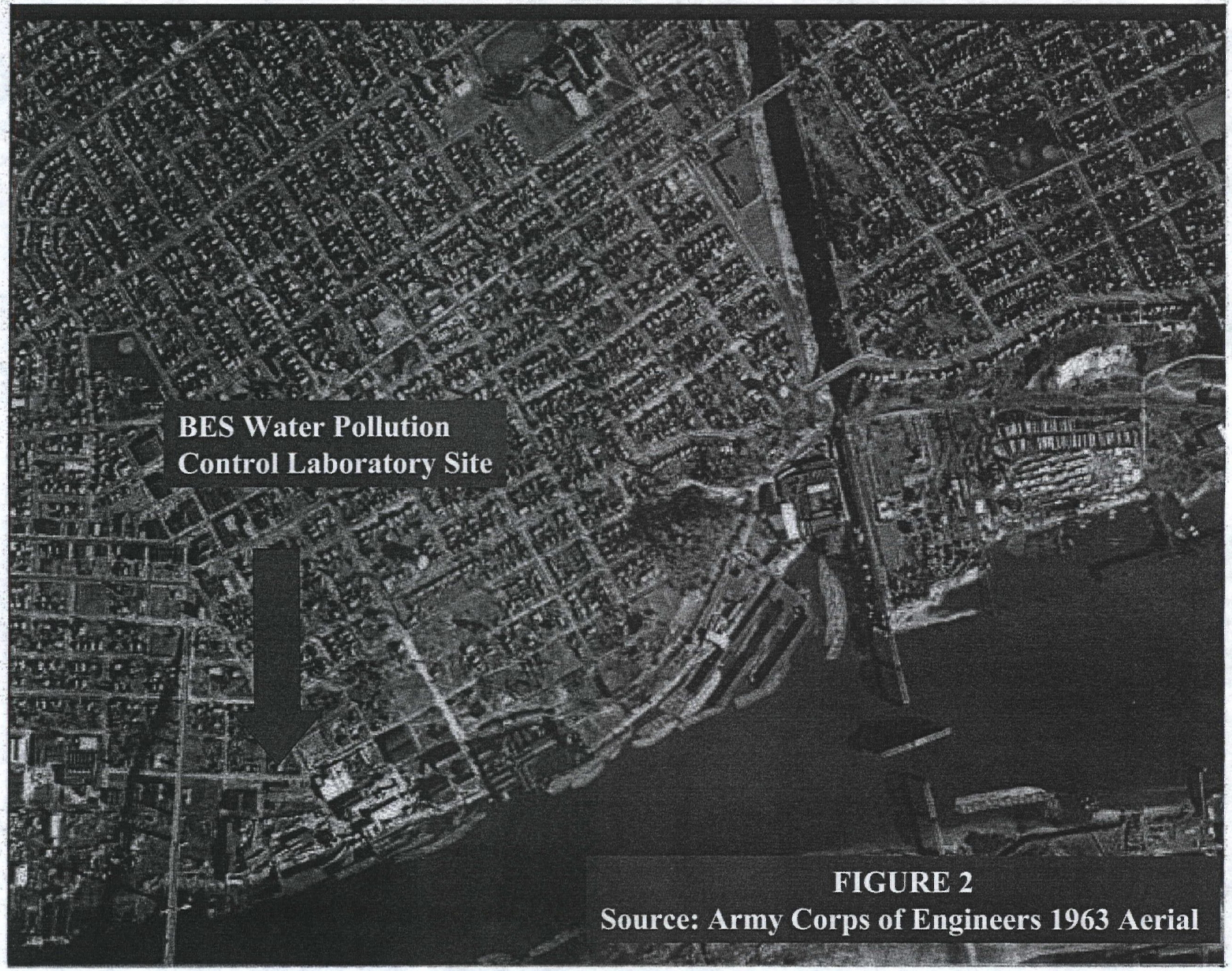

FIGURE 2
Source: Army Corps of Engineers 1963 Aerial

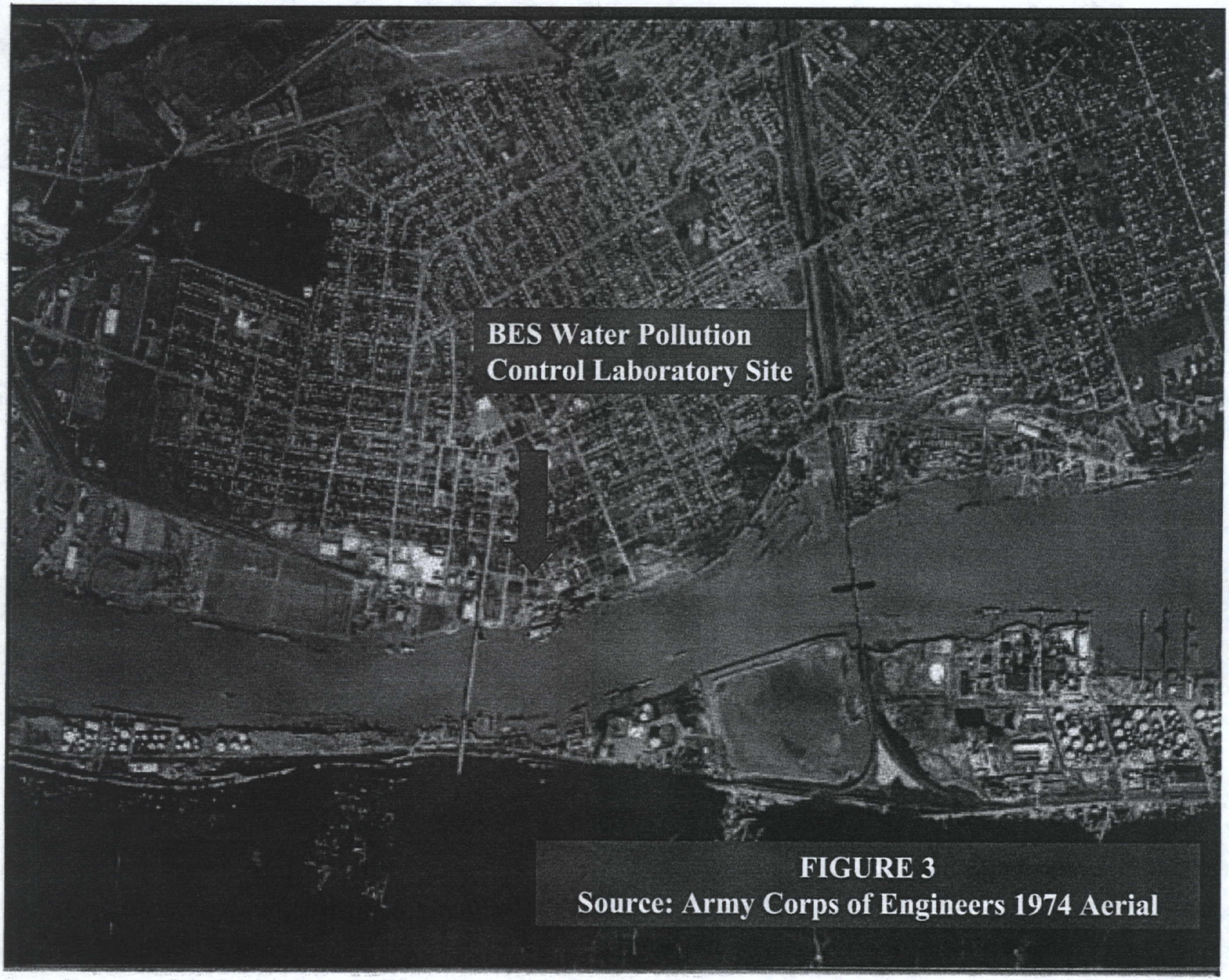

FIGURE 3
Source: Army Corps of Engineers 1974 Aerial

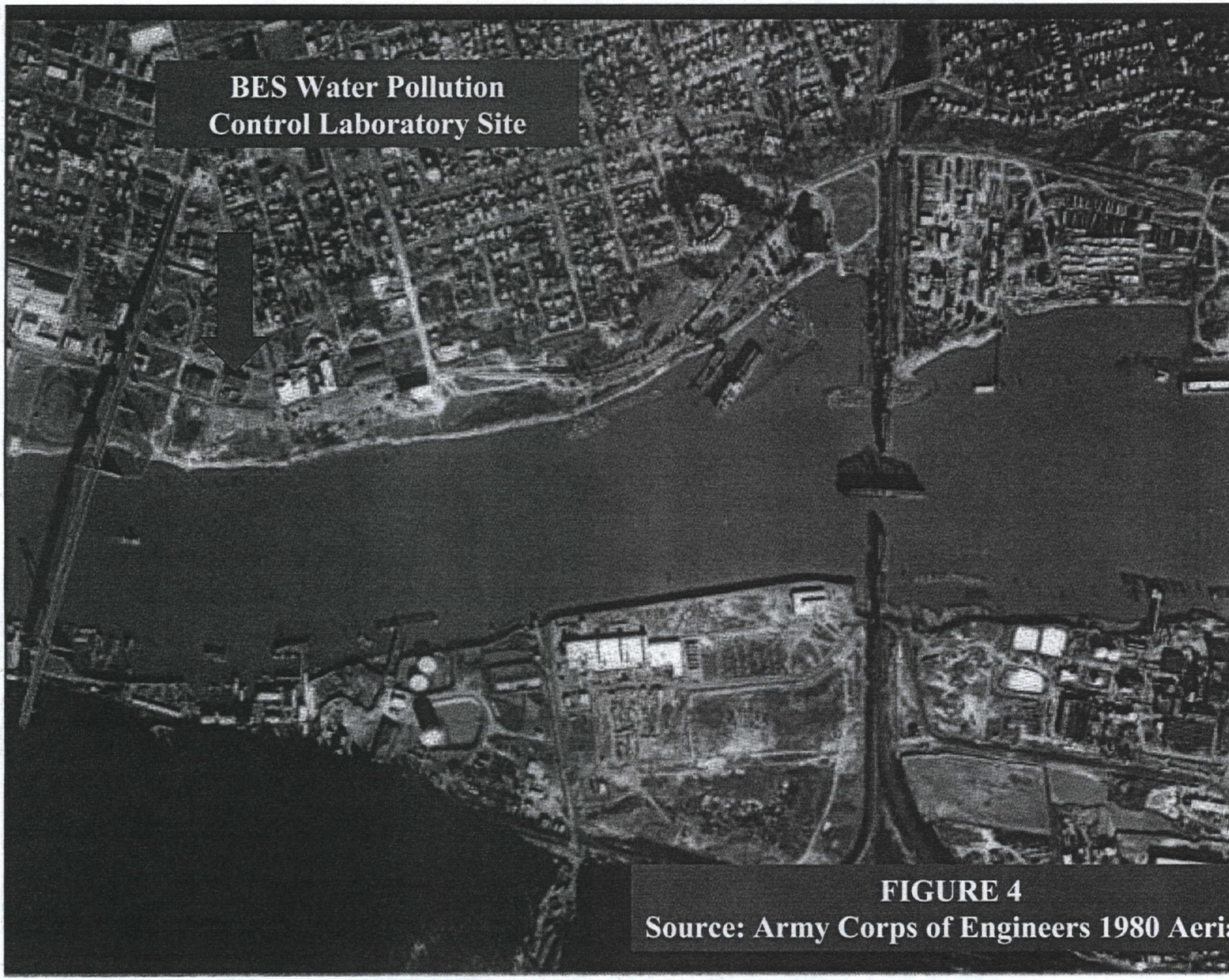

FIGURE 4
Source: Army Corps of Engineers 1980 Aerial

TABLES

City of Portland Bureau of Environmental Services Water Pollution Control Laboratory #2452

Table 1. Potential Sources and Transport Pathways Assessment

Potential Sources	Media Impacted					COIs															Potential Complete Pathway				
						TPH			VOCs																
Description of Potential Source	Surface Soil	Subsurface Soil	Groundwater	Catch Basin Solids	River Sediment	Gasoline-Range	Diesel - Range	Heavier - Range	Petroleum-Related (e.g. BTEX)	VOCs	Chlorinated VOCs	SVOCs	PAHs	Phthalates	Phenolics	Metals	PCBs	Herbicides and Pesticides	Dioxins/Furans	Butyltins	Overland Transport	Groundwater	Direct Discharge - Overwater	Direct Discharge - Storm/Wastewater	Riverbank Erosion
Upland Areas																									
Historic Operations	✓																								
lumber mill operations	?	?				?	?	?													?				
box manufacturing operations	?	?				?	?	?													?				
fill material (including black sand fill)	✓	✓			?	✓	✓	✓								✓					?				
subsurface electrical conduit		✓															✓								
Current Operations																									
WPCL																									
Overwater Areas																									
Historic Operations																									
Portland Lumber Co. deck			?												?							?	?		
Other Areas/Other Issues																									

Notes:

[1] All information provided in this table is referenced in the site summaries. If information is not available or inconclusive, a ? may be used, as appropriate. No new information is provided in this table.

✓ = Source, COI are present or current or historic pathway is determined to be complete or potentially complete.

? = There is not enough information to determine if source or COI is present or if pathway is complete

Blank = Source, COI and Historic and Current pathways have been investigated and shown to be not present or incomplete

UST Underground storage Tank
AST Above-ground Storage Tank
TPH Total Petroleum Hydrocarbons
VOCs Volatile Organic Compounds
SVOCs Semi-volatile Organic Compounds
PAHs Polycyclic aromatic hydrocarbons
BTEX Benzene, toluene, ethylbenzene, and xylenes
PCBs Polychorinated biphenols

Table 2. Queried Sediment Chemistry Data.

Surface or Subsurface	Analyte	Number of Samples	Number Detected	% Detected	Detected Concentrations Minimum	Maximum	Mean	Median	95th	Detected and Nondetected Concentrations Minimum	Maximum	Mean	Median	95th
surface	Aroclor 1016 (ug/kg)	1	0	0						20 U	20 U	20	20 U	20 U
surface	Aroclor 1242 (ug/kg)	1	0	0						20 U	20 U	20	20 U	20 U
surface	Aroclor 1248 (ug/kg)	1	0	0						20 U	20 U	20	20 U	20 U
surface	Aroclor 1254 (ug/kg)	1	0	0						20 U	20 U	20	20 U	20 U
surface	Aroclor 1260 (ug/kg)	1	0	0						20 U	20 U	20	20 U	20 U
surface	Aroclor 1221 (ug/kg)	1	0	0						40 U	40 U	40	40 U	40 U
surface	Aroclor 1232 (ug/kg)	1	0	0						20 U	20 U	20	20 U	20 U
surface	Polychlorinated biphenyls (ug/kg)	1	0	0						40 UA	40 UA	40	40 UA	40 UA
surface	Butyltin ion (ug/kg)	1	0	0						5.9 U	5.9 U	5.9	5.9 U	5.9 U
surface	Dibutyltin ion (ug/kg)	1	0	0						5.9 U	5.9 U	5.9	5.9 U	5.9 U
surface	Dibutyltin ion (ug/l)	1	0	0						0.06 U	0.06 U	0.06	0.06 U	0.06 U
surface	Tributyltin ion (ug/kg)	1	1	100	90	90	90	90	90	90	90	90	90	90
surface	Tributyltin ion (ug/l)	1	1	100	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
surface	Tetrabutyltin (ug/kg)	1	0	0						5.9 U	5.9 U	5.9	5.9 U	5.9 U
surface	Tetrabutyltin (ug/l)	1	0	0						0.02 U	0.02 U	0.02	0.02 U	0.02 U
surface	Total organic carbon (percent)	6	6	100	0.0648	2.6	0.749	0.428	0.834	0.0648	2.6	0.749	0.428	0.834
surface	Gravel (percent)	1	1	100	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57
surface	Sand (percent)	1	1	100	84.69	84.69	84.7	84.69	84.69	84.69	84.69	84.7	84.69	84.69
surface	Fines (percent)	1	1	100	14.74	14.74	14.7	14.74	14.74	14.74	14.74	14.7	14.74	14.74
surface	Silt (percent)	1	1	100	11.08	11.08	11.1	11.08	11.08	11.08	11.08	11.1	11.08	11.08
surface	Clay (percent)	1	1	100	3.66	3.66	3.66	3.66	3.66	3.66	3.66	3.66	3.66	3.66
surface	Dalapon (ug/kg)	1	0	0						1.24 U	1.24 U	1.24	1.24 U	1.24 U
surface	Dicamba (ug/kg)	1	0	0						1.27 U	1.27 U	1.27	1.27 U	1.27 U
surface	MCPA (ug/kg)	1	0	0						2.43 U	2.43 U	2.43	2.43 U	2.43 U
surface	Dichloroprop (ug/kg)	1	0	0						2.05 U	2.05 U	2.05	2.05 U	2.05 U
surface	2,4-D (ug/kg)	1	0	0						2.15 U	2.15 U	2.15	2.15 U	2.15 U
surface	Silvex (ug/kg)	1	0	0						2.07 U	2.07 U	2.07	2.07 U	2.07 U
surface	2,4,5-T (ug/kg)	1	0	0						2.53 U	2.53 U	2.53	2.53 U	2.53 U
surface	2,4-DB (ug/kg)	1	0	0						1.55 U	1.55 U	1.55	1.55 U	1.55 U
surface	Dinoseb (ug/kg)	1	0	0						1.78 U	1.78 U	1.78	1.78 U	1.78 U
surface	MCPP (ug/kg)	1	0	0						1.08 U	1.08 U	1.08	1.08 U	1.08 U
surface	Aluminum (mg/kg)	6	6	100	5300	22800	9820	7210	9180	5300	22800	9820	7210	9180
surface	Aluminum (mg/l)	1	1	100	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24
surface	Antimony (mg/kg)	6	5	83.3	1.46 J	2.78 J	2.2	2.07 J	2.68 J	1.46 J	4 UJ	2.5	2.07 J	2.78 J
surface	Antimony (mg/l)	1	0	0						0.05 U	0.05 U	0.05	0.05 U	0.05 U
surface	Arsenic (mg/kg)	6	5	83.3	13.3	22	16.4	15.1	16.9	4 U	22	14.3	14.6	16.9
surface	Arsenic (mg/l)	1	1	100	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
surface	Cadmium (mg/kg)	6	1	16.7	0.3	0.3	0.3	0.3	0.3	0.00777 U	0.3	0.0573	0.0085 U	0.0101 U
surface	Cadmium (mg/l)	1	0	0						0.002 U	0.002 U	0.002	0.002 U	0.002 U
surface	Chromium (mg/kg)	6	6	100	24.5	212	135	137	164	24.5	212	135	137	164
surface	Chromium (mg/l)	1	0	0						0.005 U	0.005 U	0.005	0.005 U	0.005 U
surface	Copper (mg/kg)	6	6	100	30	613 B	318	259 B	475 B	30	613 B	318	259 B	475 B
surface	Copper (mg/l)	1	0	0						0.002 U	0.002 U	0.002	0.002 U	0.002 U
surface	Lead (mg/kg)	6	6	100	13	132 B	91.7	107 B	110 B	13	132 B	91.7	107 B	110 B
surface	Lead (mg/l)	1	1	100	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
surface	Manganese (mg/kg)	1	1	100	322	322	322	322	322	322	322	322	322	322
surface	Manganese (mg/l)	1	1	100	2.66	2.66	2.66	2.66	2.66	2.66	2.66	2.66	2.66	2.66
surface	Mercury (mg/kg)	6	5	83.3	0.0085 J	0.1	0.0496	0.0503	0.0794	0.0085 J	0.1	0.0428	0.01 J	0.0794

Table 2. Queried Sediment Chemistry Data.

Surface or Subsurface	Analyte	Number of Samples	Number Detected	% Detected	Detected Concentrations					Detected and Nondetected Concentrations				
					Minimum	Maximum	Mean	Median	95th	Minimum	Maximum	Mean	Median	95th
surface	Mercury (mg/l)	1	0	0						0.0001 U	0.0001 U	0.0001	0.0001 U	0.0001 U
surface	Nickel (mg/kg)	6	6	100	23.8	116 B	88.7	96.7 B	107 B	23.8	116 B	88.7	96.7 B	107 B
surface	Nickel (mg/l)	1	0	0						0.01 U	0.01 U	0.01	0.01 U	0.01 U
surface	Selenium (mg/kg)	6	1	16.7	11	11	11	11	11	0.421 U	11	2.23	0.46 U	0.545 U
surface	Selenium (mg/l)	1	0	0						0.001 U	0.001 U	0.001	0.001 U	0.001 U
surface	Silver (mg/kg)	6	6	100	0.634	0.842	0.757	0.758	0.815	0.634	0.842	0.757	0.758	0.815
surface	Silver (mg/l)	1	0	0						0.0002 U	0.0002 U	0.0002	0.0002 U	0.0002 U
surface	Thallium (mg/kg)	1	1	100	5	5	5	5	5	5	5	5	5	5
surface	Thallium (mg/l)	1	0	0						0.001 U	0.001 U	0.001	0.001 U	0.001 U
surface	Zinc (mg/kg)	6	6	100	87.2	338 B	277	315 B	335 B	87.2	338 B	277	315 B	335 B
surface	Zinc (mg/l)	1	1	100	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
surface	Barium (mg/kg)	1	1	100	126	126	126	126	126	126	126	126	126	126
surface	Barium (mg/l)	1	1	100	0.045	0.045	0.045	0.045	0.045	0.045	0.045	0.045	0.045	0.045
surface	Beryllium (mg/kg)	1	1	100	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39
surface	Beryllium (mg/l)	1	0	0						0.001 U	0.001 U	0.001	0.001 U	0.001 U
surface	Calcium (mg/kg)	1	1	100	7190 J	7190 J	7190	7190 J	7190 J	7190 J	7190 J	7190	7190 J	7190 J
surface	Calcium (mg/l)	1	1	100	25.8	25.8	25.8	25.8	25.8	25.8	25.8	25.8	25.8	25.8
surface	Cobalt (mg/kg)	1	1	100	15.6	15.6	15.6	15.6	15.6	15.6	15.6	15.6	15.6	15.6
surface	Cobalt (mg/l)	1	0	0						0.003 U	0.003 U	0.003	0.003 U	0.003 U
surface	Iron (mg/kg)	1	1	100	31700	31700	31700	31700	31700	31700	31700	31700	31700	31700
surface	Iron (mg/l)	1	1	100	2.21	2.21	2.21	2.21	2.21	2.21	2.21	2.21	2.21	2.21
surface	Magnesium (mg/kg)	1	1	100	5080	5080	5080	5080	5080	5080	5080	5080	5080	5080
surface	Magnesium (mg/l)	1	1	100	15	15	15	15	15	15	15	15	15	15
surface	Potassium (mg/kg)	1	1	100	940	940	940	940	940	940	940	940	940	940
surface	Potassium (mg/l)	1	1	100	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
surface	Sodium (mg/kg)	1	1	100	967	967	967	967	967	967	967	967	967	967
surface	Sodium (mg/l)	1	1	100	10.1	10.1	10.1	10.1	10.1	10.1	10.1	10.1	10.1	10.1
surface	Titanium (mg/kg)	1	1	100	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650
surface	Vanadium (mg/kg)	1	1	100	79.7	79.7	79.7	79.7	79.7	79.7	79.7	79.7	79.7	79.7
surface	Vanadium (mg/l)	1	0	0						0.003 U	0.003 U	0.003	0.003 U	0.003 U
surface	2-Methylnaphthalene (ug/kg)	6	3	50	2.43 J	37	22.6	28.4 J	28.4 J	1.55 U	37	17.3	16.5 UJ	28.4 J
surface	Acenaphthene (ug/kg)	6	5	83.3	16.5 J	45	32.8	31.5	41.4	16.5 J	45	30.1	29.8 J	41.4
surface	Acenaphthylene (ug/kg)	6	5	83.3	3.96	31.6 J	16.6	20	21.2 J	3.96	31.6 J	16.6	16.5 UJ	21.2 J
surface	Anthracene (ug/kg)	6	6	100	12.5	68.1	35.7	32.1 J	41	12.5	68.1	35.7	32.1 J	41
surface	Fluorene (ug/kg)	6	3	50	14 J	33	24.4	26.2 J	26.2 J	1.55 U	33	18.2	16.5 UJ	26.2 J
surface	Naphthalene (ug/kg)	6	5	83.3	3.93 J	90	40.8	28.3 J	77.4	3.93 J	90	36.8	16.5 UJ	77.4
surface	Phenanthrene (ug/kg)	6	6	100	25.8	230	160	162	224 J	25.8	230	160	162	224 J
surface	Low Molecular Weight PAH (ug/kg)	6	6	100	78.24 A	474.7 A	283	273.4 A	379 A	78.24 A	474.7 A	283	273.4 A	379 A
surface	Dibenz(a,h)anthracene (ug/kg)	6	6	100	17.5	53	39.5	44.8 J	51	17.5	53	39.5	44.8 J	51
surface	Benz(a)anthracene (ug/kg)	6	6	100	101 J	351 J	210	190	252	101 J	351 J	210	190	252
surface	Benzo(a)pyrene (ug/kg)	6	6	100	116 J	328 J	235	195	310	116 J	328 J	235	195	310
surface	Benzo(b)fluoranthene (ug/kg)	1	1	100	180	180	180	180	180	180	180	180	180	180
surface	Benzo(g,h,i)perylene (ug/kg)	6	6	100	79.4 J	279 J	193	196	262	79.4 J	279 J	193	196	262
surface	Benzo(k)fluoranthene (ug/kg)	1	1	100	220	220	220	220	220	220	220	220	220	220
surface	Chrysene (ug/kg)	6	6	100	194 J	398 J	257	207	312	194 J	398 J	257	207	312
surface	Fluoranthene (ug/kg)	6	6	100	122	493 J	362	340	466	122	493 J	362	340	466
surface	Indeno(1,2,3-cd)pyrene (ug/kg)	6	6	100	94.9 J	227 J	167	171	220	94.9 J	227 J	167	171	220
surface	Pyrene (ug/kg)	6	6	100	180	499	369	380	436 J	180	499	369	380	436 J

Table 2. Queried Sediment Chemistry Data.

Surface or Subsurface	Analyte	Number of Samples	Number Detected	% Detected	Detected Concentrations Minimum	Maximum	Mean	Median	95th	Detected and Nondetected Concentrations Minimum	Maximum	Mean	Median	95th
surface	Benzo(b+k)fluoranthene (ug/kg)	6	6	100	197	549 J	373	366	516	197	549 J	373	366	516
surface	High Molecular Weight PAH (ug/kg)	6	6	100	1277.5 A	3051.8 A	2210	1982.5 A	2887 A	1277.5 A	3051.8 A	2210	1982.5 A	2887 A
surface	Polycyclic Aromatic Hydrocarbons (ug/kg)	6	6	100	1355.74 A	3361.7 A	2490	2255.9 A	3357.32 A	1355.74 A	3361.7 A	2490	2255.9 A	3357.32 A
surface	2,4'-Dichlorobiphenyl (ug/kg)	5	0	0						0.29 U	0.34 U	0.32	0.32 U	0.34 U
surface	2,2',5-Trichlorobiphenyl (ug/kg)	5	0	0						0.29 U	0.34 U	0.316	0.32 U	0.33 U
surface	2,4,4'-Trichlorobiphenyl (ug/kg)	5	3	60	0.26 JP	0.44	0.36	0.38 P	0.38 P	0.19 U	0.44	0.296	0.26 JP	0.38 P
surface	2,2',3,5'-Tetrachlorobiphenyl (ug/kg)	5	3	60	0.27 J	1.42	0.72	0.47 P	0.47 P	0.17 U	1.42	0.504	0.27 J	0.47 P
surface	2,2',5,5'-Tetrachlorobiphenyl (ug/kg)	5	2	40	0.57 JP	2.39 P	1.48	0.57 JP	0.57 JP	0.27 U	2.39 P	0.762	0.3 U	0.57 JP
surface	2,3',4,4'-Tetrachlorobiphenyl (ug/kg)	5	4	80	0.38 P	2.54 P	1.36	0.9	1.62	0.16 U	2.54 P	1.12	0.9	1.62
surface	2,2',4,5,5'-Pentachlorobiphenyl (ug/kg)	5	3	60	0.51 P	3.51	1.52	0.54	0.54	0.22 U	3.51	1	0.51 P	0.54
surface	2,3,3',4,4'-Pentachlorobiphenyl (ug/kg)	5	0	0						0.13 U	0.15 U	0.14	0.14 U	0.15 U
surface	2,3',4,4',5-Pentachlorobiphenyl (ug/kg)	5	2	40	0.43 JP	2.82 P	1.63	0.43 JP	0.43 JP	0.16 U	2.82 P	0.75	0.18 U	0.43 JP
surface	2,2',3,3',4,4'-Hexachlorobiphenyl (ug/kg)	5	2	40	0.27 JP	0.83 P	0.55	0.27 JP	0.27 JP	0.13 U	0.83 P	0.304	0.15 U	0.27 JP
surface	2,2',3,4,4',5'-Hexachlorobiphenyl (ug/kg)	5	5	100	0.28 JP	6.28	2.09	1.1	1.72 P	0.28 JP	6.28	2.09	1.1	1.72 P
surface	2,2',4,4',5,5'-Hexachlorobiphenyl (ug/kg)	5	5	100	1.19	4.2 P	2.55	2.24 P	3.14	1.19	4.2 P	2.55	2.24 P	3.14
surface	2,2',3,3',4,4',5-Heptachlorobiphenyl (ug/kg)	5	5	100	0.25 J	1.25	0.606	0.49 J	0.65 JP	0.25 J	1.25	0.606	0.49 J	0.65 JP
surface	2,2',3,4,4',5,5'-Heptachlorobiphenyl (ug/kg)	5	5	100	0.63	2.26	1.43	1.42	1.77	0.63	2.26	1.43	1.42	1.77
surface	2,2',3,4',5,5',6-Heptachlorobiphenyl (ug/kg)	5	4	80	0.65 P	1.35	1.02	1	1.07	0.17 U	1.35	0.848	1	1.07
surface	2,4'-DDD (ug/kg)	5	0	0						2.16 UJ	2.84 UJ	2.4	2.35 UJ	2.38 UJ
surface	2,4'-DDE (ug/kg)	5	0	0						2.16 UJ	2.84 UJ	2.4	2.35 UJ	2.38 UJ
surface	2,4'-DDT (ug/kg)	5	0	0						2.16 UJ	2.84 UJ	2.4	2.35 UJ	2.38 UJ
surface	4,4'-DDD (ug/kg)	6	3	50	1.7 J	6.09 J	3.84	3.72 J	3.72 J	0.42 UJ	6.09 J	2.14	0.463 UJ	3.72 J
surface	4,4'-DDE (ug/kg)	6	1	16.7	3.79 J	3.79 J	3.79	3.79 J	3.79 J	0.498 UJ	3.79 J	1.32	0.541 UJ	2 U
surface	4,4'-DDT (ug/kg)	6	2	33.3	2.4	3.96 J	3.18	2.4	2.4	0.56 UJ	3.96 J	1.48	0.617 UJ	2.4
surface	Total of 3 isomers: pp-DDT,-DDD,-DDE (ug/kg)	6	3	50	4.1 A	9.88 A	7.22	7.68 A	7.68 A	0.56 UA	9.88 A	3.91	0.617 UA	7.68 A
surface	Aldrin (ug/kg)	6	0	0						0.933 UJ	1.22 UJ	1.03	0.99 U	1.03 UJ
surface	alpha-Hexachlorocyclohexane (ug/kg)	6	0	0						0.672 UJ	0.99 U	0.788	0.731 UJ	0.882 UJ
surface	beta-Hexachlorocyclohexane (ug/kg)	6	0	0						0.915 UJ	1.2 UJ	1.01	0.99 U	1.01 UJ
surface	delta-Hexachlorocyclohexane (ug/kg)	6	0	0						0.83 UJ	1.3 UI	0.986	0.903 UJ	1.09 UJ
surface	gamma-Hexachlorocyclohexane (ug/kg)	6	0	0						0.826 UJ	1.08 UJ	0.93	0.899 UJ	0.99 U
surface	cis-Chlordane (ug/kg)	6	0	0						0.86 UJ	1.13 UJ	0.962	0.935 UJ	0.99 U
surface	trans-Chlordane (ug/kg)	5	0	0						0.878 UJ	1.15 UJ	0.976	0.955 UJ	0.967 UJ
surface	Oxychlordane (ug/kg)	5	0	0						2.16 UJ	2.84 UJ	2.4	2.35 UJ	2.38 UJ
surface	cis-Nonachlor (ug/kg)	5	0	0						2.16 UJ	2.84 UJ	2.4	2.35 UJ	2.38 UJ
surface	trans-Nonachlor (ug/kg)	5	0	0						2.16 UJ	2.84 UJ	2.4	2.35 UJ	2.38 UJ
surface	Dieldrin (ug/kg)	6	0	0						0.709 UJ	2 U	0.99	0.771 UJ	0.931 UJ
surface	alpha-Endosulfan (ug/kg)	6	0	0						0.921 UJ	1.21 UJ	1.02	0.99 U	1.01 UJ
surface	beta-Endosulfan (ug/kg)	6	0	0						0.836 UJ	2 U	1.11	0.909 UJ	1.1 UJ
surface	Endosulfan sulfate (ug/kg)	6	0	0						0.787 UJ	2 U	1.06	0.856 UJ	1.03 UJ
surface	Endrin (ug/kg)	6	0	0						0.78 UJ	2 U	1.06	0.849 UJ	1.02 UJ
surface	Endrin aldehyde (ug/kg)	6	0	0						0.882 UJ	2 U	1.15	0.959 UJ	1.16 UJ
surface	Endrin ketone (ug/kg)	6	0	0						0.608 UJ	2 U	0.897	0.661 UJ	0.798 UJ
surface	Heptachlor (ug/kg)	6	0	0						0.745 UJ	0.99 U	0.855	0.81 UJ	0.977 UJ
surface	Heptachlor epoxide (ug/kg)	6	0	0						0.79 UJ	1.04 UJ	0.898	0.859 UJ	0.99 U
surface	Methoxychlor (ug/kg)	6	0	0						2.98 UJ	9.9 U	4.41	3.24 UJ	3.91 UJ
surface	Toxaphene (ug/kg)	6	0	0						13.6 UJ	99 U	29.1	14.7 UJ	17.8 UJ
surface	gamma-Chlordane (ug/kg)	1	0	0						0.99 U	0.99 U	0.99	0.99 U	0.99 U
surface	Chlordane (cis & trans) (ug/kg)	5	0	0						3.04 UJ	4 UJ	3.38	3.31 UJ	3.35 UJ

Table 2. Queried Sediment Chemistry Data.

Surface or Subsurface	Analyte	Number of Samples	Number Detected	% Detected	Detected Concentrations Minimum	Maximum	Mean	Median	95th	Detected and Nondetected Concentrations Minimum	Maximum	Mean	Median	95th
surface	Diesel fuels (mg/kg)	5	5	100	4.92	26	14.4	10.6	23.1	4.92	26	14.4	10.6	23.1
surface	Lube Oil (mg/kg)	5	5	100	20.6	162	89.7	74.7	117	20.6	162	89.7	74.7	117
surface	2,3,4,6-Tetrachlorophenol (ug/kg)	5	0	0						15.5 U	188 U	113	165 UJ	180 U
surface	2,4,5-Trichlorophenol (ug/kg)	6	0	0						15.5 U	188 U	111	99 U	180 U
surface	2,4,6-Trichlorophenol (ug/kg)	6	0	0						15.5 U	188 U	111	99 U	180 U
surface	2,4-Dichlorophenol (ug/kg)	6	0	0						15.5 U	188 U	104	59 U	180 U
surface	2,4-Dimethylphenol (ug/kg)	6	0	0						15.5 U	188 U	97.5	20 U	180 U
surface	2,4-Dinitrophenol (ug/kg)	6	0	0						77.3 U	940 U	504	200 UJ	902 U
surface	2-Chlorophenol (ug/kg)	6	0	0						15.5 U	188 U	97.5	20 U	180 U
surface	2-Methylphenol (ug/kg)	6	0	0						15.5 U	188 U	97.5	20 U	180 U
surface	2-Nitrophenol (ug/kg)	6	0	0						15.5 U	188 U	111	99 U	180 U
surface	4,6-Dinitro-2-methylphenol (ug/kg)	6	0	0						77.3 U	940 U	504	200 U	902 U
surface	4-Chloro-3-methylphenol (ug/kg)	6	0	0						15.5 U	188 U	101	39 U	180 U
surface	4-Methylphenol (ug/kg)	6	1	16.7	50	50	50	50	50	30.9 U	376 U	197	50	361 U
surface	4-Nitrophenol (ug/kg)	7	0	0						1.23 U	940 U	418	99 U	902 U
surface	Pentachlorophenol (ug/kg)	7	2	28.6	24.9	29.2 J	27.1	24.9	24.9	16.7 UJ	188 U	100	99 UJ	180 U
surface	Phenol (ug/kg)	6	0	0						15.5 U	188 U	97.5	20 U	180 U
surface	2,3,5,6-Tetrachlorophenol (ug/kg)	5	0	0						15.5 U	188 U	113	165 UJ	180 U
surface	Dimethyl phthalate (ug/kg)	6	0	0						15.5 U	188 U	97.5	20 U	180 U
surface	Diethyl phthalate (ug/kg)	6	0	0						15.5 U	188 U	97.5	20 U	180 U
surface	Dibutyl phthalate (ug/kg)	6	1	16.7	43	43	43	43	43	15.5 U	188 U	101	43	180 U
surface	Butylbenzyl phthalate (ug/kg)	6	0	0						15.5 U	188 U	97.5	20 U	180 U
surface	Di-n-octyl phthalate (ug/kg)	6	0	0						15.5 U	188 U	97.5	20 U	180 U
surface	Bis(2-ethylhexyl) phthalate (ug/kg)	6	3	50	141 J	204	181	198 J	198 J	90 U	204	167	180 U	198 J
surface	Bis(2-chloro-1-methylethyl) ether (ug/kg)	1	0	0						20 UJ	20 UJ	20	20 UJ	20 UJ
surface	2,4-Dinitrotoluene (ug/kg)	6	0	0						15.5 U	188 U	111	99 U	180 U
surface	2,6-Dinitrotoluene (ug/kg)	6	0	0						15.5 U	188 U	111	99 U	180 U
surface	2-Chloronaphthalene (ug/kg)	6	0	0						1.55 U	20 U	12.8	16.5 UJ	18.8 U
surface	2-Nitroaniline (ug/kg)	6	0	0						15.5 U	188 U	111	99 U	180 U
surface	3,3'-Dichlorobenzidine (ug/kg)	6	0	0						15.5 U	188 U	111	99 UJ	180 U
surface	3-Nitroaniline (ug/kg)	6	0	0						15.5 U	188 U	114	120 UJ	180 U
surface	4-Bromophenyl phenyl ether (ug/kg)	6	0	0						15.5 U	188 U	97.5	20 U	180 U
surface	4-Chloroaniline (ug/kg)	6	0	0						15.5 U	188 U	104	59 UJ	180 U
surface	4-Chlorophenyl phenyl ether (ug/kg)	6	0	0						15.5 U	188 U	97.5	20 U	180 U
surface	4-Nitroaniline (ug/kg)	6	0	0						15.5 U	188 U	111	99 UJ	180 U
surface	Aniline (ug/kg)	5	0	0						15.5 U	188 U	113	165 UJ	180 U
surface	Benzoic acid (ug/kg)	6	0	0						77.3 U	940 U	504	200 U	902 U
surface	Benzyl alcohol (ug/kg)	6	0	0						15.5 U	188 U	97.5	20 UJ	180 U
surface	Bis(2-chloroethoxy) methane (ug/kg)	6	0	0						15.5 U	188 U	97.5	20 U	180 U
surface	Bis(2-chloroethyl) ether (ug/kg)	6	0	0						15.5 U	188 U	101	39 U	180 U
surface	Carbazole (ug/kg)	6	2	33.3	48 J	49.7 J	48.9	48 J	48 J	15.5 U	188 U	108	49.7 J	180 U
surface	Dibenzofuran (ug/kg)	6	1	16.7	24	24	24	24	24	15.5 U	188 U	98.2	24	180 U
surface	Hexachlorobenzene (ug/kg)	11	0	0						1.08 UJ	188 U	53.7	15.5 U	180 U
surface	Hexachlorobutadiene (ug/kg)	11	0	0						1.08 UJ	188 U	53.7	15.5 U	180 U
surface	Hexachlorocyclopentadiene (ug/kg)	6	0	0						15.5 U	188 U	111	99 UJ	180 U
surface	Hexachloroethane (ug/kg)	11	0	0						1.08 UJ	188 U	53.7	15.5 U	180 U
surface	Isophorone (ug/kg)	6	0	0						15.5 U	188 U	97.5	20 U	180 U
surface	Nitrobenzene (ug/kg)	6	0	0						15.5 U	188 U	97.5	20 U	180 U

Table 2. Queried Sediment Chemistry Data.

Surface or Subsurface	Analyte	Number of Samples	Number Detected	% Detected	Detected Concentrations Minimum	Maximum	Mean	Median	95th	Detected and Nondetected Concentrations Minimum	Maximum	Mean	Median	95th
surface	N-Nitrosodimethylamine (ug/kg)	5	0	0						77.3 U	940 U	565	823 UJ	902 U
surface	N-Nitrosodipropylamine (ug/kg)	6	0	0						15.5 U	188 U	101	39 U	180 U
surface	N-Nitrosodiphenylamine (ug/kg)	6	0	0						15.5 U	188 U	97.5	20 U	180 U
surface	Bis(2-chloroisopropyl) ether (ug/kg)	5	0	0						15.5 U	188 U	113	165 UJ	180 U
surface	1,2-Dichlorobenzene (ug/kg)	6	0	0						15.5 U	188 U	97.5	20 U	180 U
surface	1,3-Dichlorobenzene (ug/kg)	6	0	0						15.5 U	188 U	97.5	20 U	180 U
surface	1,4-Dichlorobenzene (ug/kg)	6	0	0						15.5 U	188 U	97.5	20 U	180 U
surface	1,2,4-Trichlorobenzene (ug/kg)	6	0	0						15.5 U	188 U	97.5	20 U	180 U

SUPPLEMENTAL FIGURES

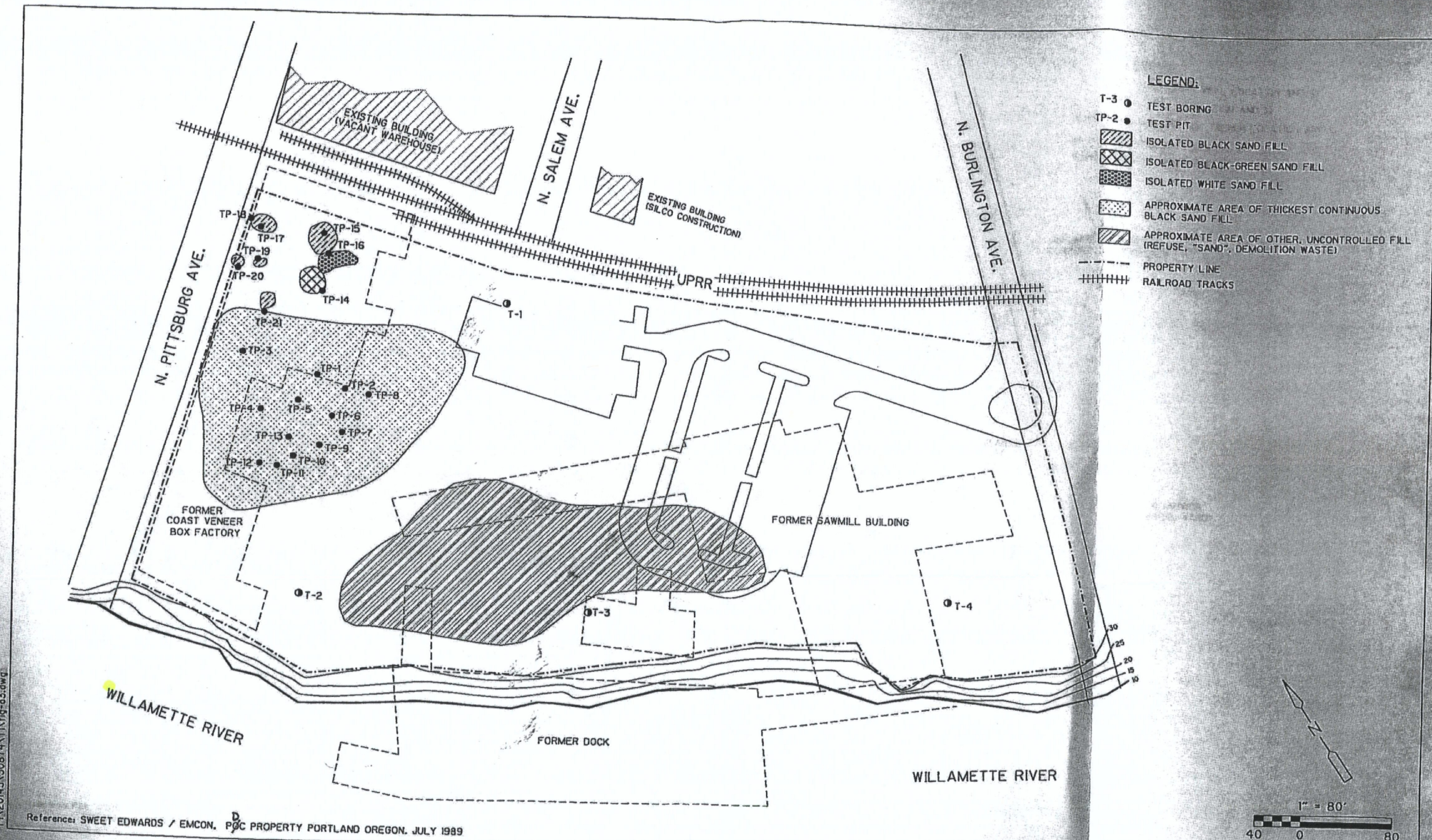

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Figure No. 5
1989 EXPLORATION OF FILL
BY SWEET EDWARDS/EMCON

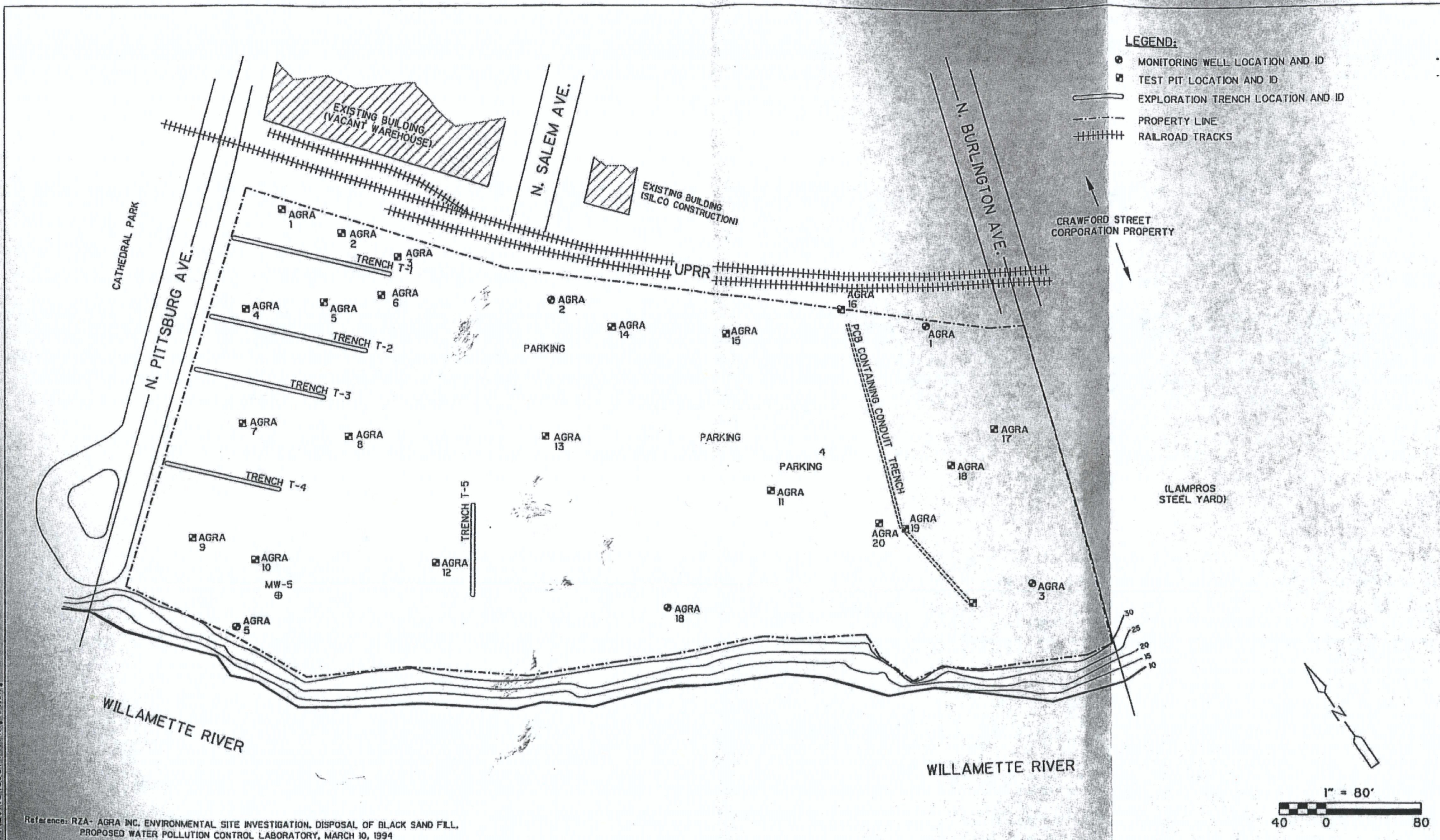

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Figure No. 6
1994 ENVIRONMENTAL SITE INVESTIGATIONS BY RZA-AGRA